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Exploring Acupuncture Therapies for Mild Cognitive Impairment: An Updated Meta-Analysis with Dose-Response Mapping

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Han, JZ.

Corresponding author:
Jize Han

727593372@qq.com

Author Affiliation:
Clinical Medical College of AcupunctureMoxibustion and Rehabilitation, Guangzhou University of Chinese Medicine, Guangzhou, China.

ADMINISTRATIVE INFORMATION

Support - 2024B3022.

Review Stage at time of this submission - Data analysis.

Conflicts of interest - None declared.

INPLASY registration number: INPLASY2025110028

Amendments - This protocol was registered with the International Platform of Registered Systematic Review and Meta-Analysis Protocols (INPLASY) on 11 November 2025 and was last updated on 11 November 2025.

INTRODUCTION

Review question / Objective P: adults diagnosed with mild cognitive impairment under NIA-AA, DSM-5, ADNI or equivalent Chinese criteria; I: needle-based acupuncture, manual or electro, applied alone or layered onto usual care; C: any control arm, whether untreated, placebo/sham, or active pharmacological and non-pharmacological regimens, alone or combined, without restriction; O: cure rate, MMSE, MoCA, AVLT, ADAS-cog, P300 ERP, ADL scores and adverse events; S: full-text RCTs in Chinese or English indexed up to 20 July 2025.The purpose of this study was to evaluate the efficacy, safety, and quality of the literature of the Randomized Controlled Trials (RCTs) of acupuncture for the treatment of mild Cognitive Impairment (MCI), with a view to providing reference for future related research.

Rationale The proportion of mild cognitive impairment (MCI) progressing to dementia annually may be as high as 15%. While pharmacological treatments can improve cognitive function to some extent, they often cause side effects and impose a significant economic burden on patients. Thus, there is an urgent need for safe, low-cost, non-pharmaceutical interventions.
Acupuncture has been shown to modulate neurotransmitters, cerebral metabolism, and synaptic plasticity. Both clinical trials and animal studies have demonstrated its potential to improve cognitive function. Although relevant meta-analyses exist, they are limited by the small number of included studies and a persistent risk of bias. Therefore, a rigorous, methodologically sound, and comprehensive approach is essential to clarify its clinical value and guide future research.

Condition being studied By precisely needling selected scalp and body acupoints, acupuncture concurrently modulates neurotransmitter balance, boosts cerebral glucose metabolism, reinforces hippocampal synaptic plasticity and stimulates neurotrophic-factor release, thereby reliably improving global cognition in patients with mild

cognitive impairment and raising both MMSE and MoCA scores.

METHODS

Search strategy The corresponding keywords utilized in the search strategy were "acupuncture therapy/ acupuncture/ acupoints/ meridians/ electroacupuncture" in combination with "mild cognitive impairment/ cognitive impairment/ mild neurocognitive disorder/ neurocognitive disorder/ mild cognitive disorder/ cognitive disorder/ cognitive decline".

Participant or population Patients who have been clinically diagnosed with mild cognitive impairment (MCI).

Intervention Acupuncture.

Comparator No restrictions.

Study designs to be included RCT.

Eligibility criteria Inclusion criteria were defined as follows: (1) Published randomized controlled trials with full-text availability; (2) Older adults and patients with mild cognitive impairment (MCI) who met one or more diagnostic criteria, such as the National Institute on Aging-Alzheimer's Association (NIA-AA), the Diagnostic and Statistical Manual of Mental Disorders-5th Edition (DSM-5), the Alzheimer's Disease Neuroimaging Initiative (ADNI), and the Chinese Expert Consensus on the Diagnosis and Treatment of Mild Cognitive Impairment Due to Alzheimer's Disease; Exclude：(1) Non-randomized controlled studies, including reviews, animal experiments, meta-analyses, summaries, Single-arm trial, case-control observational study, randomized controlled experimental study and protocols; (2) A single-session randomized controlled trial; (3) A randomized trial with healthy volunteers as the control group; (4) Unclear or absent diagnostic criteria.

Information sources Cochrane Library, Cold Spring Harbor Laboratory(CSH), PubMed, Embase, Medline, China National Knowledge Infrastructure (CNKI), Chinese Science Citation Database (VIP), Wanfang Database and Chinese Clinical Trial Registry (ChiCTR).

Main outcome(s) ADL, MoCA, MMSE, ADSD-cog, AVLT, P300 and FRT.

Quality assessment / Risk of bias analysis Random sequence generation (selection bias); (2) Allocation concealment (selection bias); (3) Blinding of participants and personnel (performance bias); (4) Blinding of outcome assessment (detection bias); (5) Selective reporting (reporting bias); (6) Other biases.

Strategy of data synthesis 1.Software & packages：R 4.3.0, meta (v5.5), metafor (v4.4), dmetar, robvis, Gradepro.
2.Effect-size computation：Continuous outcomes：MMSE, MoCA, ADAS-Cog, CDR, WHO-BCAI uesd MD or SMD. Binary outcome (progression to dementia): risk ratio (RR) with 95 % CI.

Subgroup analysis 1.manuel acupuncture vs electroacupuncture 2.according to the treatment time.

Sensitivity analysis Relies on MMSE and MoCA as cognitive proxies. If future trials adopt more demanding batteries , the magnitude of benefit may shrink below the minimal clinically important difference.

Language restriction No restrictions.

Country(ies) involved China.

Keywords acupuncture, mild cognitive impairment.

Contributions of each author

Author 1 - Han Jize.
Email: 727593372@qq.com